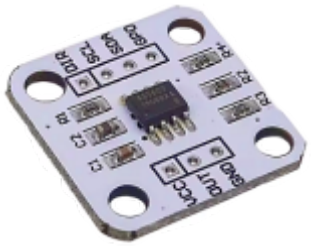
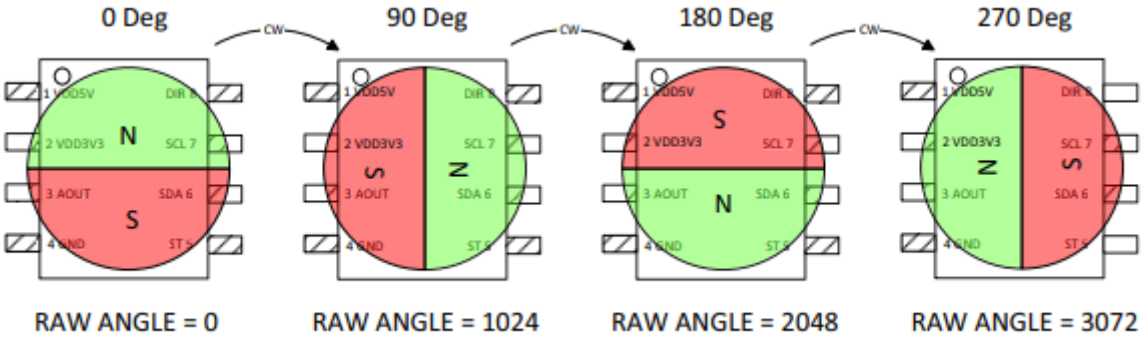
lamaPLC: AS5600 Magnetic Induction Angle Measurement Sensor Module



The AS5600 is a straightforward magnetic rotary position sensor featuring a high-resolution 12-bit analog or PWM output. It measures the absolute angle of a diametrically magnetized on-axis magnet without contact. Designed for contactless potentiometer applications, its durable build prevents interference from external homogeneous magnetic fields.

The industry-standard I²C interface allows easy programming of non-volatile parameters without a dedicated programmer. By default, the output covers 0 to 360 degrees, but a smaller output range can be set by programming a start (zero) and stop (maximum) angle.

Additionally, the AS5600 includes a smart low-power mode to automatically lower power consumption. An input pin (DIR) determines the output polarity based on rotation direction: connecting DIR to ground causes the output to increase clockwise, while connecting it to VDD causes it to increase counterclockwise.

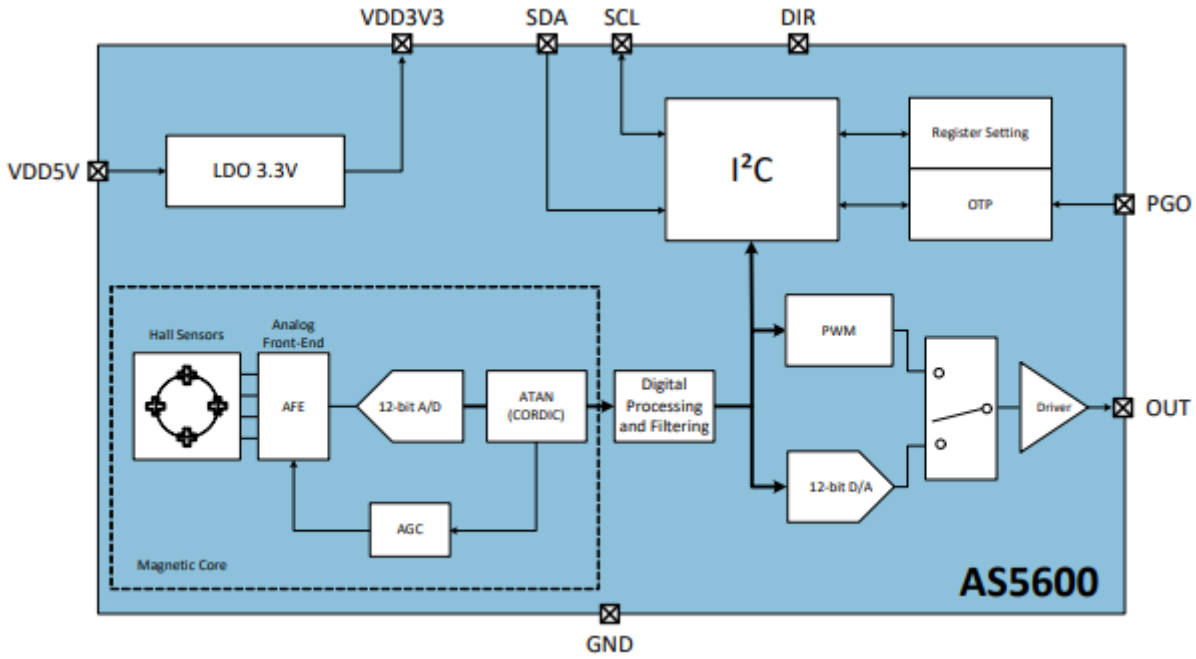


Key Features

- **Resolution:** 12-bit digital output, providing 4,096 positions per full 360° rotation (approximately 0.087° per step).
- **Multiple Output Modes:** Supports I²C digital interface, PWM, and ratiometric Analog voltage output.
- **Programmable Range:** While the default is 0° to 360°, users can program a custom maximum angle from 18° to 360° to apply full resolution to a smaller range.
- **Direction Control:** A dedicated DIR pin allows you to set whether the output value increases with clockwise or counterclockwise rotation.
- **Low Power:** Features smart low-power modes that automatically reduce consumption, making it suitable for battery-powered devices.

Technical Specifications

- **Operating Voltage:** 3.3V to 5V
- **Interface:** I²C (fixed address **0x36**)
- **Temperature Range:** -40°C to +125°C
- **Magnet Distance:** Best performance within 0.5 mm to 3 mm air gap



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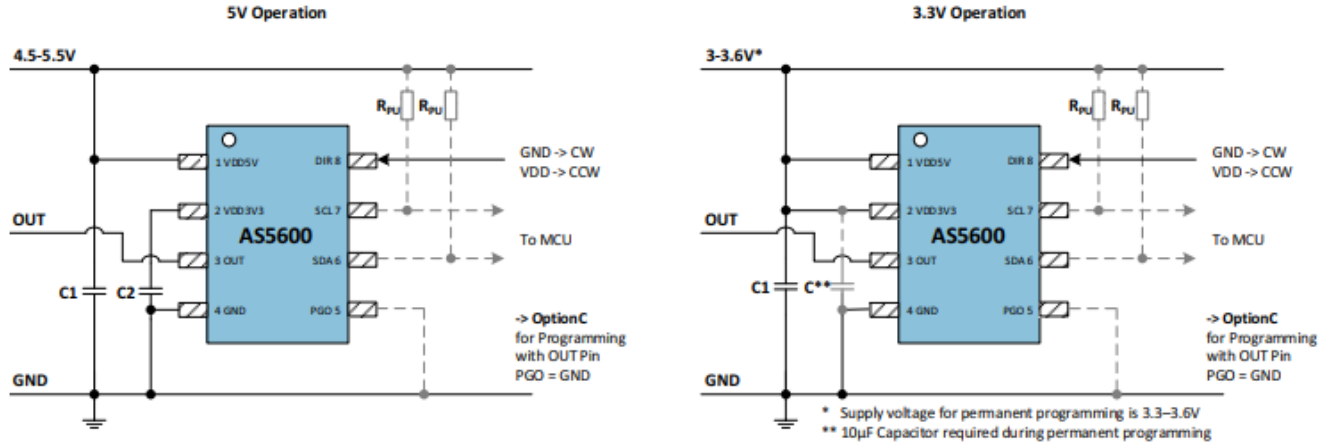
AS5600 Pinout

Pin Name	Function	Description
VCC	Power Supply	Connect to 3.3V or 5V.
GND	Ground	Connect to establish common ground with your circuit.
SCL	I²C Clock	Serial clock line used for digital communication (0x36 fixed) address).
SDA	I²C Data	Serial data line for angle readings and configuration.
DIR	Direction	GND clockwise increases value; VCC = Counter-clockwise increases.
OUT	Output	Can provide an analog voltage or PWM signal proportional to the angle.
PGO	Program Option	Used for programming the sensor's non-volatile memory (OTP), which is usually left disconnected for standard applications' use.

Critical Usage Notes

- **Operating Voltage:** When powering with 5V, make sure the module's onboard voltage regulator (if available) is used properly. For the raw chip, Pin 1 (VDD5V) and Pin 2 (VDD3V3) have specific wiring needs for 3.3V versus 5V operation.
- **Pull-up Resistors:** The I²C lines (SDA/SCL) need pull-up resistors (typically 4.7kΩ) to VCC if they are not already present on your specific module.
- **DIR Pin Stability:** It is strongly advised not to leave the DIR pin floating. Connect it to GND or VCC to avoid erratic position readings.
- **PGO Pin:** Some modules include a resistor between PGO and GND that may disable the OUT pin. If the analog/PWM output isn't working, check this connection.

AS5600 Wiring



AS5600 Arduino Wiring (I²C Mode)

AS5600 Pin	Arduino Pin (Uno/Nano)	Arduino Pin (Mega)
VCC	5V (or 3.3V)	5V (or 3.3V)
GND	GND	GND
SDA	A4	Pin 20
SCL	A5	Pin 21
DIR	GND (for clockwise)	GND (for clockwise)

AS5600 Arduino example code

To read angle data from the AS5600 using an Arduino, the most reliable approach is to use the I²C interface. You can use a library like the **Adafruit AS5600 Library** or the **Rob Tillaart AS5600 Library** for simplified functions.

This code initializes the sensor and prints the angle in both raw units (0–4095) and degrees (0–360°) to the Serial Monitor.

```
#include "AS5600.h"
#include "Wire.h"
```

```
AS5600 as5600;

void setup() {
  Serial.begin(115200);
  Wire.begin();

  if (!as5600.begin()) {
    Serial.println("Error: AS5600 not detected. Check wiring!");
    while (1);
  }

  // Set clockwise as the increasing direction
  as5600.setDirection(AS5600_CLOCK_WISE);
  Serial.println("AS5600 Initialized.");
}

void loop() {
  // Read raw 12-bit value (0-4095)
  uint16_t rawAngle = as5600.readAngle();

  // Convert to degrees (360.0 / 4096.0)
  float degrees = rawAngle * (360.0 / 4096.0);

  Serial.print("Raw: ");
  Serial.print(rawAngle);
  Serial.print(" | Angle: ");
  Serial.print(degrees, 2);
  Serial.println("°");

  delay(100); // Read every 100ms
}
```

Key Functions

- **as5600.readAngle():** Returns the current 12-bit filtered angle.
- **as5600.getMagnetStatus():** Returns a status byte (*0x20 = Magnet detected; 0x10 = Too weak; 0x08 = Too strong*).
- **as5600.setDirection():** Allows you to flip the rotation direction in software if the DIR pin is left floating or controlled by an I/O pin.

Troubleshooting

- **Magnet Detection:** If the serial monitor displays constant values, verify the magnet distance (0.5-3mm).
- **Address:** The I²C address is fixed at 0x36 and cannot be modified.
- **Pull-up Resistors:** Make sure your module has pull-up resistors on SDA/SCL, or add 4.7kΩ resistors to VCC if the I²C scan fails.

I²C topics on lamaPLC

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• lamaPLC Communication: 1-Wire	2026/04/23 21:51	1-wire, communication, bus, microlan, i2c, uart, usart, ds18b20
• lamaPLC Communication: I²C	2025/09/23 21:25	i2c, i c, smbus, philips, bus, communication, arduino
• lamaPLC project: Sension SCD CO² measurement module	2026/04/15 19:34	scd30, scd40, scd41, iaq, ndir, sensor, i2c, arduino code
• LamaPLC: AHT10 Modul	2026/03/22 03:14	communication, i2c, temperature, humidity, sensor, aht, aht 10, modul
• LamaPLC: AHT20 / BMP280 Modul	2026/04/23 21:52	bmp280, aht20, adafruit, temperature, humidity, pressure, sensor, arduino, code, i2c
• LamaPLC: APDS - Avago ALS and proximity detection sensors with I²C communication	2026/04/23 21:52	avago, apds-9900, apds-9930, apds-9960, als, proximity, detection, gesture recognition, gesture, i2c, communication, sensor, arduino, code
• lamaPLC: Arduino Modul: BME680	2026/05/12 18:40	code, c, 2026, arduino, bme680, sensor, i2c, comunication
• lamaPLC: AS5600 Magnetic Induction Angle Measurement Sensor Module	2026/05/13 00:06	communication, i2c, as5600, as-5600, magnetic, induction, angle, sensor
• lamaPLC: Bi-Directional Logic Level Converter 3.3V ↔ 5V	2026/04/12 00:34	bi-directional, logic level converter, i2c, uart, spi
• LamaPLC: BMP/BME Bosch Temperature/Humidity/Pressure sensors with I²C communication	2026/04/23 21:52	bme280, bme680, bme688, bmp180, bmp280, hw-611, hw611, bosch, temperature, humidity, pressure, sensor, arduino, i2c, communication, ai, cjmcu, volatile organic compounds, vocs, volatile sulfur compounds, vscs, iaq
• LamaPLC: CJMCU-219/INA-219 breakout board/IC with I²C communication	2026/04/23 21:52	cjmcu-219, ina-219, ina219, breakout board, i2c, communication, sensor, voltage, current, arduino, code, cjmcu
• LamaPLC: CJMCU-3216 / AP-3216 integrated digital ambient light and proximity sensor module/IC with I²C communication	2026/04/23 21:52	cjmcu-3216, cjmcu, ap-3216, ap3216, ambient light, proximity, sensor, arduino, code, i2c, communication
• lamaPLC: CJMCU-811 CCS811 Gas Sensor (VOCs TVOC CO2)	2026/04/23 21:52	cjmcu-811, ccs811, gas, sensor, vocs, tvoc, eco2, co2, arduino, air quality metal oxide, mox, i2c, micropython, rp2040-eth
• LamaPLC: D6T Omron Non-Contact Thermal Sensors with I²C communication	2026/04/23 21:52	d6t, d6t-32l, d6t-44l, d6t-8l, d6t-1a, omron, non-contact, thermal, sensor, i2c, arduino, code
• LamaPLC: DPS Infineon Temperature/Pressure sensors with I2C communication	2026/04/23 21:52	dps310, infineon, temperature, pressure, sensor, arduino, i2c, communication, code
• lamaPLC: Energy, power, current, and voltage	2025/05/31 23:32	i2c, i c, communication, arduino, energy, power, current, sensor, ina226

• LamaPLC: ENS ScioSense Multi-gas sensors with I²C communication	2026/04/23 21:52	ens160, sciosense, gas-quality, i2c, communication, sensor, arduino, code, eco₂, tvoc, aqi, indoor air quality, iaq, co₂, voc
• lamaPLC: ESP32 / ESP8266	2025/11/22 00:07	esp8266, esp32, esp32-c2, esp32-c3, esp32-c5, esp32-c6, esp32-c61, esp32-h2, esp32-s2, esp32-s3, esp32-p4, espressif systems, communication, ethernet, ip, wi-fi, thread, zigbee, matter, homekit, bluetooth, mqtt, adc, spi, uart, i2c, i2s, rmt, pwm, usb, usb otg, twai
• LamaPLC: Gas sensors	2023/07/01 17:29	gas, sensor, i2c, onewire, communication, mq-3, mq-4, mq-5, mq-6, mq-7, mq-8, mq-9, mq-135, gm-102b, gm-302b, gm-502b, gm-702b, alcohol, ch4, natural gas, smoke, lng, co, co2, lpg, h2, iso-butane, nox, nh3, benzene, town gas, formaldehyde, propane, humidity, temperature, voc, grv gas sens v2
• lamaPLC: GY-511 6DOF sensor module	2026/04/23 21:52	stmicroelectronics, lsm303dlhc, i2c, lsm303, sensor, gy-511, 6dof, pololu, module, arduino
• LamaPLC: GY-9250 MPU-9250/6500 9-axis Attitude Sensor Board	2026/04/23 21:52	ak8963, gy-9250, mpu-9250, 9-axis, motion detection, magnetometer, communication, i c, i2c, spi
• LamaPLC: HDC Texas Instruments Temperature/humidity sensors with I²C communication	2026/04/23 21:52	sht21, htu21, si7021, gy-21, gy-213v, hdc1080, gy-213v-hdc1080, cjmcu, cjmcu-1080, texas instruments, temperature, humidity, sensor, i2c, communication, arduino, code
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• LamaPLC: HTU TE Connectivity temperature/humidity sensors with I²C communication	2026/04/23 21:52	htu, htu31d, htu21d, htu20d, sht20, htu20, sht21, htu21, si7021, gy-21, gy-213v, hdc1080, si702, gy-20, sht31, htu31, si7031, gy-31, te connectivity, temperature, humidity, i2c, communication, sensor, arduino, code
• lamaPLC: INA modules with Arduino libraries	2026/04/23 21:52	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina219, gy-219, ina226, gy-216, ina228, gy-228, ina237, ina238, ina260, ina3221, ina
• lamaPLC: INA226 - current/voltage/power monitor with I²C communication	2026/04/23 21:52	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina226, ina219, ina
• lamaPLC: LCD 1602/2004 with I²C communication	2026/02/14 18:27	communication, i2c, display, lcd, 1602, 2004, hd44780, pcf8574, pcf8574t, pcf8574at, arduino

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• lamaPLC: MCP23017 / MCP23S17 16-Bit I/O Expander with Serial Interface I²C / SPI	2026/04/23 21:52	communication, i2c, mcp23017, mcp23s17, spi, i o expander, serial, cjmcu-2317, cjmcu
• lamaPLC: MLX90614 (GY-906) infrared non-contact thermometer	2026/05/08 00:03	communication, i2c, temperature, mlx90614, gy-906, modul, infrared, non-contact thermometer, dsp, pwm, smbus, hailege
• lamaPLC: PCF857x I/O Expander chip/modul with I²C communication	2026/05/15 01:03	communication, i2c, pcf857x, pcf8574, pcf8574a, pcf8575, i o expander, i o extension, nxp, texas instruments
• LamaPLC: Pixart PAJ7620U2 Gesture recognition sensors/module with I²C communication	2026/04/23 21:52	paj7620u2, gy-paj7620, pixart, gesture recognition, i2c, communication, sensor, arduino, code
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• lamaPLC: RP2040_ETH_Modul: Read BME 680/688 sensor data	2026/05/12 21:06	code, micropython, 2026, rp2040 eth, bme680, i2c, sensor, communication
• lamaPLC: RP2040_ETH_Modul: Read BME 680/688 sensor data and store in Modbus input registers	2026/05/12 18:58	code, micropython, 2026, rp2040 eth, bme680, i2c, sensor, communication
• LamaPLC: SC16IS750 / SC16IS752: One or two serial (UART) ports from microcontroller via I²C or SPI communication	2026/04/23 21:52	cjmcu-750, cjmcu-752, cjmcu, nxp, sc16is750, sc16is752, uart, serial, i2c, spi, modul, converter, arduino, code
• LamaPLC: SGP Sensirion TVOC/VOC sensors with I²C communication	2026/04/15 19:41	sgp30, sgp40, sgp41, sensirion, gas-sensor, i2c, communication, sensor, arduino, code, eco₂, voc, tvoc, indoor air quality, iaq, nox, hydrogen
• LamaPLC: SHT Sensirion Temperature/humidity sensor with I²C communication	2026/04/23 21:52	sht20, sht21, sht25, sht30, sht31, sht35, sht40, gy21, temperature, humidity, i2c, communication, sensor, arduino, code
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• lamaPLC: TCA9548A (HW617); Low-Voltage 8-Channel I²C Switch Module	2026/02/14 23:51	tca9548a, hw617, i2c, switch, communication, expansion board, arduino
• lamaPLC: TM1637 7-segment display	2026/02/14 18:26	i2c, 7-segment display, display, tm1637, arduino
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• LamaPLC: VL53Lnn STMicroelectronics time-of-flight (ToF) laser-ranging sensors with I²C communication	2026/04/23 21:52	vl53l0x, vl53l1x, vl53l0 1xv2, gy-530, time-of-flight, tof, laser-ranging, i2c, communication, sensor, arduino, code
• LamaPLC: VL6180X STMicroelectronics Time-of-Flight (ToF) sensor with I²C communication	2026/04/23 21:52	vl6180x, stmicroelectronics, time-of-flight, tof, i2c, communication, sensor, arduino, code
• lamaPLC: XGZP68xx: Silicon Pressure Sensors/Module	2026/05/15 15:17	communication, i2c, sensor, modul, pressure, cfsensor, xgzp68xx, xgzp6810d, xgzp6857d, xgzp6859d, xgzp6887d, xgzp6897d, xgzp6899a, piezoresistive, capacitive
• Magnetic angle sensors	2026/03/05 21:19	magnetic angle sensor, magnetic flux, sensor, spi, i2c, pwm, communication, modul, as5047p, as5600, mt6701, mt6816, mt6835, tle5012b, amr, gmr, tmr, anisotropic magnetoresistive
• SSH1106/SSD1306 OLED Display with I²C communication	2026/02/14 18:27	i2c, oled, display, ssd1306, sh1106, ssh1106, arduino, cmos

communication, i2c, AS5600, AS-5600, magnetic, induction, angle, sensor

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